REMARKS

The Applicant thanks the Examiner for suggesting claim amendments during a telephone conversation March 4, 2010. The Examiner believed that amending claim 24 to include the subject matter of canceled claim 25 as recited in claim 13 of the preliminary amendment filed August 8, 2006 would be beneficial in overcoming the pending rejections over the referenced prior art.

The Applicant believes that, since all the limitations of the claims have been previously considered, no further search or consideration is required by the Examiner. As such, the Applicant respectfully requests removal of the finality of the Official Action and allowance of the pending claims.

The Applicant would also like to draw the Examiners attention to the claims which have been granted in EP 1 714 046 B1 and which are substantially identical to the claims of the application. An English translation of the granted EP claims can be found on pages 4 and 5 of the attached copy of the European patent.

The drawings are objected to by the Examiner for introducing new matter. All of the raised drawing objections are believed to be overcome by the new Replacement Sheets of formal drawings which accompany the attached Submission. If any further amendment to the drawings is believed necessary, the Examiner is invited to contact the undersigned representative of the Applicant to discuss the same.

Claims 24, 26, 27, 29 and 30 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Applicant's admitted prior art with reference to Mikami et al. `673 (U.S. Patent No. 6,039,673) in view of Rieger et al. `708 (U.S. Patent No. 7,025,708). The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the above amendments and the following remarks.

The work machine and control function of the admitted art, as discussed in paragraph 7 of the Applicants specification, includes a drive motor which drives power consuming devices and also drives the wheels of the vehicle via both a hydrodynamic torque converter and a clutch. The Applicant contends that there is no discussion of the specific arrangement of these elements in relation to each other. As noted by the Examiner the "driving motor drives the driving wheels via a hydrodynamic torque converter and a clutch device", however the order in which the drive passes through the hydrodynamic torque converter and clutch is not discussed. In contrast to the Examiner's assertion that "the clutch device is situated between the drive and the turbine wheel of the torque converter (i.e. output) because the pump wheel of the torque converter (i.e. input) is driven by the driving motor", the Applicant reasserts that the hydrodynamic torque converter is present between the motor and the clutch, as stated in paragraph 12 of the original specification.

Paragraph 7 of the specification states that "without this control function a very high power loss develops in the torque converter when the drive is connected and the vehicle service brake is actuated, since the turbine wheel in the converter has come to a complete or nearly complete halt, while the pump wheel, driven by the driving motor, rotates at the stall speed". Again, there is no discussion of the order in which the drive passes through the hydrodynamic torque converter and clutch. What paragraph 7 indicates is that there is a great power loss "when the drive is connected and the vehicle service brake is actuated", this does not specify the location of the clutch, it merely discusses a cause of power loss when both the clutch and the brake are both engaged.

Mikami et al. `673 relates to a control system for an automatic transmission. The control system includes a stop state detector which determines a "vehicle stopping state" when each of a forward drive gear is engaged, the accelerator pedal is released, and a brake pedal is depressed (col. 3, lns. 39-43). When such a stopping state is detected, the clutch is "almost

disengaged" by a disengaging system 103, thus placing the clutch in a "neutral control" state and following which, the brake is engaged placed in a "hill-hold" state (col. 3, lns. 45-48).

"Neutral control" of the clutch is maintained by a disengaging system 103 which controls the engagement of the clutch depending only on "the engine rotational speed N_E and the clutch input side rotational speed N_{C1}" (col. 7, lns. 17-20). The hill-hold state is initiated, after the clutch is placed in the neutral control state, at a time that is dictated by a delay system (col. 2, lns. 13-15).

The claims of the application are distinct from the teachings of Mikami et al. `673 as this reference fails to teach an electronic controller which determines an input torque of the clutch and disengages the clutch depending on the determined input torque of the clutch and the braking signal; and the hydrodynamic torque converter is located between the clutch device and the driving motor and comprises a pump wheel and a turbine wheel, <u>the input torque is determined from a rotational speed of the pump wheel, the rotational speed of the turbine wheel and a characteristic rotational speed line of the hydrodynamic torque converter</u>. In contrast the clutch of Mikami et al. `673 is disengaged when all three of the above operating conditions are met, one of which is the depression of the brake pedal. After those conditions are met, the clutch is next disengaged and then the brakes are engaged.

Turning now to Rieger et al. `708, this reference relates to a method of changing the clutch torque in the power train of a vehicle while driving in creep mode. It is noted that the method disclosed by Rieger et al. `708 is used in a vehicle which is traveling in a creep mode. As stated, "one or more operating parameters of the vehicle are monitored which describe a slow drive mode or creep drive mode of the vehicle and, as a function of the operating parameter(s), the torque transmitted by the clutch is changed." (col. 2, lns. 17-21). The operating parameters used in the method of this reference pertain to parameters that are present when the vehicle is in a slow drive mode or a creep mode.

Rieger et al. `708 teaches that the clutch is controlled taking into account one or more of the following parameters: 1) the strength of brake actuation which influences the speed of the vehicle; variables of the drive motor, such as 2) the rotational speed, engine torque or a variable of the drive motor; 3) the difference in rotational speeds between the input and the output of the clutch; and 4) an accelerator pedal value. Although Rieger et al. `708 teaches using a number of parameters when controlling the function of a clutch, the reference fails to teach a number of the factors claimed in the application and fails to teach the manner in which these factors are considered when controlling the function of a clutch. As such the Applicant contends that the claims of the application are distinct from the teachings Rieger et al. `708.

In the Official Action the Examiner indicates that Rieger et al. `708 "teaches a method of disengaging a clutch based on the input torque of a clutch and a braking request" and cites column 3, lines 13-22 and lines 30-35 and column 4, lines 32-49 as support.

First, lines 13-22 of column 3 relate to the operating parameter 2) listed above and teach that braking the vehicle causes an increase in torque on the engine and depending on the change of torque on the engine, the clutch may be disengaged at a faster rate such that "the clutch transmits a *lower braking torque* to the engine".. The Applicant asserts that toque on the input side of the clutch, as claimed, is not considered at all by the reference when adjusting the rate of clutch disengagement, the only torque considered here by the reference is the change of torque on the engine. The Applicant further contends that the method of Rieger et al. `708 assumes a drive train with only a clutch being located between the engine and the transmission. If a toque converter were placed between the engine and the clutch, the operating parameters of the torque converter would also have to be considered which they are not.

Second, lines 30-35 of column 3 relate to the operating parameter 3) listed above and teach that "the operating parameter being considered is a rotational speed differential between the clutch input side and the clutch output side". As the Examiner is probably well aware,

torque on the input of a clutch as claimed is distinct from the rotational speed of the clutch input or a difference of rotational speeds of the clutch input and out as taught by the reference.

Third, lines 32-49 of column 4 relate to a method of adapting "the biting point of the clutch" depending on information obtained during the above method of changing the clutch torque, that is depending on information that is obtained from the above operating parameters. According to this citation the biting point of the clutch is adjusted depending on a comparison of the torque output by the engine during braking and the torque resulting from the reduction of engine speed.

With regard to the operating parameter 1) listed above it appears as though the strength of the actuation of the vehicle brake may arguably relate to the speed in which the clutch is opened. In distinction from the claims only the braking force is considered when disengaging the clutch. The operating parameter 4) listed above relates to the actuation of an accelerator pedal value and since the same is not claimed in the application it will not be discussed here.

The claims of the application are distinct from the teachings of Rieger et al. `708 in that this reference fails to teach an electronic controller which determines an input torque of the clutch and disengages the clutch depending on the determined input torque of the clutch and the braking signal; and the hydrodynamic torque converter is located between the clutch device and the driving motor and comprises a pump wheel and a turbine wheel, <u>the input torque is determined from a rotational speed of the pump wheel, the rotational speed of the turbine wheel and a characteristic rotational speed line of the hydrodynamic torque converter</u>.

Claims 25, 28 and 33 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Applicant's admitted prior art with reference to Mikami et al. `673 and in view of Rieger et al. `708 and further in view of Fonkalsrud et al. `549 (U.S. Patent No. 6,560,549). `The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the above amendments and the following remarks.

Fonkalsrud et al. `549 relates to a method for determining the transmission output torque of an earth moving machine. It should be noted that Fonkalsrud et al. `549 teaches an arrangement of drive train elements in Fig. 1. In this figure, the engine 105 is first connected to a clutch 116 which is connected to the torque converter 106, specifically to the impeller 108 of the torque converter 106. The torque converter 106 is connected downstream to the transmission 114. The clutch 116 is therefore arranged between the motor 105 and the torque converter 106, not between the torque converter and the downstream drive wheels as currently claimed.

In further contrast to the claims of the application, the method of Fonkalsrud et al. `549 includes a step of determining the output torque of a torque converter which the Examiner equates with the input torque of the clutch as claimed. Although the output torque of the torque converter may arguably relate to the input torque of the clutch, even if the clutch was located downstream from the torque converter (in Fonkalsrud et al. `549 the clutch is upstream from the torque converter), the manner in which Fonkalsrud et al. `549 determines the output torque of the torque converter is distinctly different than the manner in which the input torque of the clutch is determined in the claims of the application.

The converter output torque is determined, as taught by Fonkalsrud et al. `549, with an equation that depends on each of "the primary torque, the torque ratio, and the input and output speed of the torque converter 113." Each of these four variable needs to be calculated before determining the output torque of the torque converter. First, "the input speed of the of the converter 106 is equal to the engine speed" when the impeller clutch is not slipping (col 3, lns. 60-62). Next, "the output speed of the converter 106 is determined by analyzing the torque converter output speed signal" (col. 4, 24-27). Then, "the primary torque is determined using a look-up table" (col. 4, ln. 41) and finally the "torque ratio is dependent upon the converter speed ratio, and is determined using a lookup table" (col. 4, lns. 60-62). The step of

determining the output torque of the converter includes numerous additional steps thus making the process of Fonkalsrud et al. `549 much more complicated and extensive than the steps of the claimed method.

In distinction from the teachings of Fonkalsrud et al. `549, the claims of the application include the step of determining the input torque of the clutch which includes considering the rotational speed of the hydraulic pump, the rotational speed of the turbine of the toque converter and the characteristic rotational speed line of the hydrodynamic torque converter. Fonkalsrud et al. `549 specifically fails to teach giving consideration to the rotational speed of a hydraulic pump (power-consuming device). The Examiner indicates that the pump speed is the same as the input speed of the torque converter because they are both driven by the engine. The Applicant contends that this is not necessarily true. Both of the torque converter and the hydraulic pump exert a "braking type of torque" (a resistance to rotation) on the drive from the engine. The braking torques of these two elements are independently variable. That is, the braking toque from the torque converter continually varies depending on the degree of engagement of the torque converter, the transmission ratio that is engaged and/or the degree of which wheels of the vehicle are braked. This was a substantial consideration and specifically discussed in the Rieger et al. `708 disclosure between column 2 line 58 - column 3, line 29, which indicates that the rotational speed and the torque of the motor is variable depending on the braking force applied by the driver. Furthermore the braking torque on the engine from the hydraulic pump may also vary depending on the load placed on it. When empty, the bucket of a bucket loader will require less hydraulic force from the pump to lift the bucket. This would result in a lower braking torque being applied on the motor by the hydraulic pump. Whereas, when the bucket is loaded it will require a greater amount of hydraulic force from the pump to lift the bucket. This in turn would result in a larger braking force being applied on the engine from the hydraulic pump.

The Applicant asserts that Fonkalsrud et al. `549 fails to teach the claimed limitations of determining the input torque of the clutch based on a rotational speed of the hydraulic pump, a rotational speed of a turbine of the hydrodynamic torque converter and a characteristic rotational speed line of the hydrodynamic torque converter

Claims 31 and 32 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Applicant's admitted prior art with reference to Mikami et al. `673 and in view of Rieger et al. `708 and in view of Smart `930. The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the above amendments and the following remarks.

The Applicant acknowledges that the additional reference of Smart `930 may arguably relate to the features indicated by the Examiner in the official action. Nevertheless, the Applicant respectfully submits that the combination of the base references of Mikami et al. `673 and Rieger et al. `708 with this additional art of still fails to in any way teach, suggest, disclose or remotely hint at the above distinguishing features of the presently claimed invention. As such, all of the raised rejections should be withdrawn at this time in view of the above amendments and remarks.

If any further amendment to this application is believed necessary to advance prosecution and place this case in allowable form, the Examiner is courteously solicited to contact the undersigned representative of the Applicant to discuss the same.

In view of the above amendments and remarks, it is respectfully submitted that all of the raised rejections should be withdrawn at this time. If the Examiner disagrees with the Applicant's view concerning the withdrawal of the outstanding rejection(s) or applicability of the Mikami et al. `673, Rieger et al. `708, Fonkalsrud et al. `549 and/or Smart `930 references, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure required by case law. As such teaching, suggestion and/or disclosure is not present in the

applied references, the raised rejection should be withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field, the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

In view of the foregoing, it is respectfully submitted that the raised rejection(s) should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,

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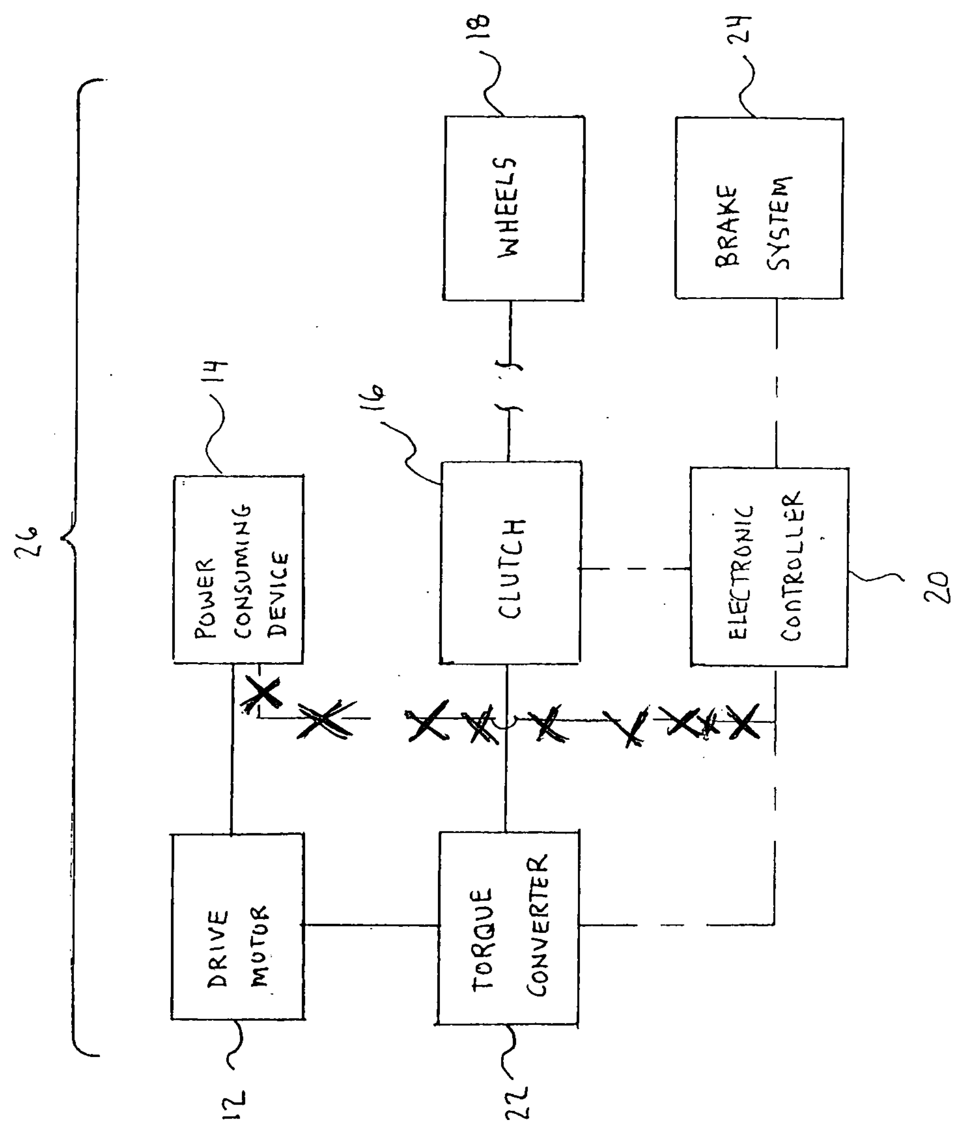
26
POWER CONSUMING DEVICE
14
DRIVE MOTOR
12
CLUTCH
16
WHEELS
18
TORQUE CONVERTER
22
ELECTRONIC CONTROLLER
20
BRAKE SYSTEM
24

FIG. 2